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Lightning activity in Portugal: RAIDEN project overview

João Santos (1), Solange Leite (1), Marcelo Fragoso (2), João Sousa (1), Margarida Reis (1), Sandra Correia (2), and Raiden Project participants (2)

(1) UTAD, CITAB, Physics, Vila Real, Portugal (jsantos@utad.pt), (2) Centro de Estudos Geográficos, Faculdade de Letras, Universidade de Lisboa, Portugal

Thunderstorms are important atmospheric hazards, mainly because cloud-to-ground strikes (CGS) can affect people, causing serious damages in buildings and equipments, as well as in the natural systems (e.g. by triggering wildfires). The potential damages associated with CGS have been increasing as society develops (e.g. due to greater use of electronic equipment), though an accurate risk assessment also requires an accurate analysis of the spatial and temporal distributions of the lightning activity. The effects of regional climate change in the lightning activity still present many uncertainties. However, there is a consensus in the scientific community that climate change in Europe is likely to impact on frequency, severity and location of extreme events. In Portugal, the national meteorological service (Instituto de Meteorologia) maintains a lightning detection network (LDN). The Portuguese LDN has started its regular functioning in June 2002 and since then few studies have been devoted to this topic. Therefore, there is a significant lack of data and of systematized information. Due to the high relevance of the lightning activity to many socio-economic systems throughout the country, the RAIDEN project (Lightning activity in Portugal: variability patterns and socioeconomic impacts) aims at characterizing the spatial-temporal variability of the lightning activity in Portugal and at assessing its corresponding risks and socioeconomic impacts. This study will be based on data provided by the Portuguese LDN and follows a multidisciplinary approach. The project is focused on a 7-year period (2003-2009) of CGS data and the research program starts with the study of the main climatological aspects of lightning activity, regarding the spatial contrasts of CGs incidence as also its temporal rhythms at different time scales, namely the interannual, seasonal and diurnal variability. Furthermore, the thermodynamical conditions associated with the CGs will be explored by identifying likely relationships between the daily occurrences of CGs and a number of atmospheric parameters (e.g. stability indices).